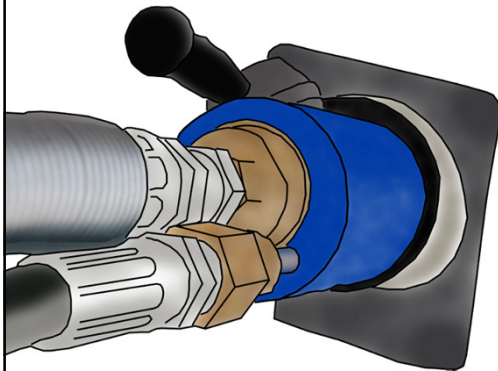




Biomethane in transport



“Experiences of use in different types of vehicles”

Mårten Ahlm
Biogas Syd

www.biomaster-project.eu



- *Biogas Syd is a regional co-operation organisation for biogas actors in South Sweden*

- *Biogas Syd's objective is to make sure that biogas gets the best regional conditions possible to grow. Both when it comes to production, distribution and use of biogas.*



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Picture: <http://www.seafish.org>



Swedish transport sector is to about 95 % dependent on imported fossil fuels.
Import means export of capital, mostly to countries outside EU

The image shows a large offshore oil rig on the sea. The rig is a complex structure of steel and concrete, with a tall central tower and several cranes. A flare is visible on the right side, emitting a flame. The sea is dark and the sky is overcast.

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Packed food wastes

Organic household waste

Manure & agricultural rest products

Waste water

Rest products

Food industry

Recirculation of minerals: Nitrogen and Phosfor



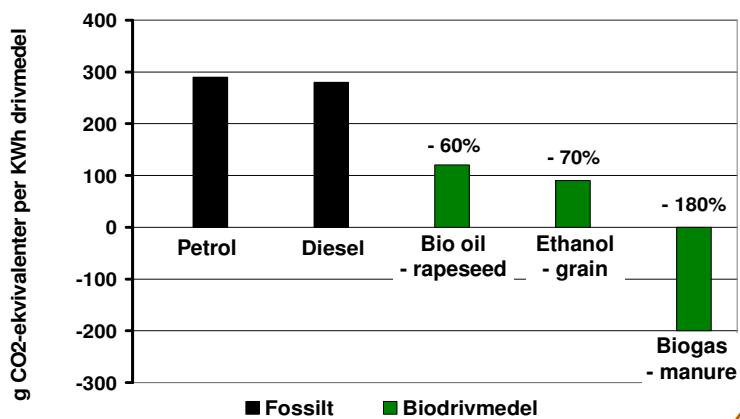
The collage consists of several images: a pile of red and white food packaging, a brown paper bag with a banana in a grey bin, a large circular agricultural pond, a factory building with a large tank, and a variety of fresh vegetables like lettuce, tomatoes, and onions.

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Biogas from manure



– lowest CO₂ impact of all available fuels!



The graph is based on life cycle analysis for different fuels.
Source: *Bioenergi från jordbruket – en växande resurs. SOU 2007:36*

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Different applications for Biogas



Heat



Transport fuel



Power



Biomethane = needs upgrading

Injecting biomethane into natural gas grid

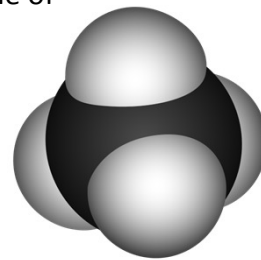
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In Sweden biogas = biomethane and biomethane in vehicles = vehicle gas

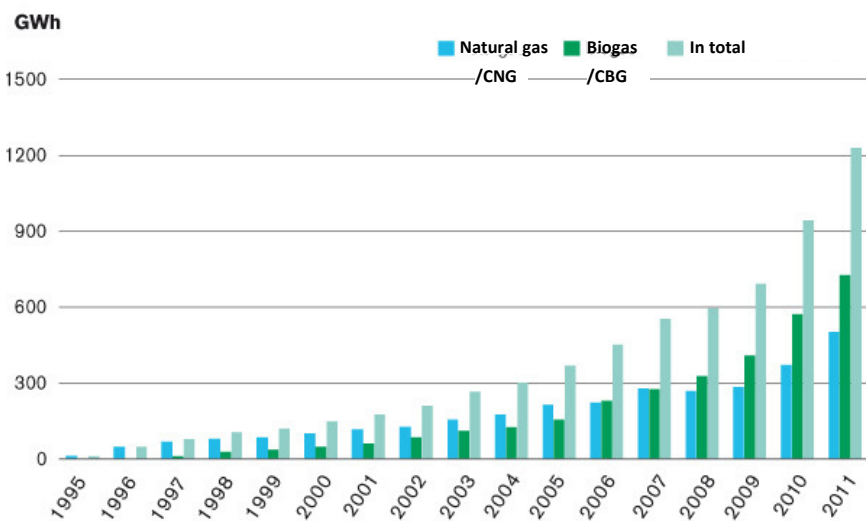
- Vehicle gas is the name used for biomethane and/or natural gas when used as fuel for vehicles
- Biogas was about 60 % of the total sold volume of vehicle gas in Sweden in 2011



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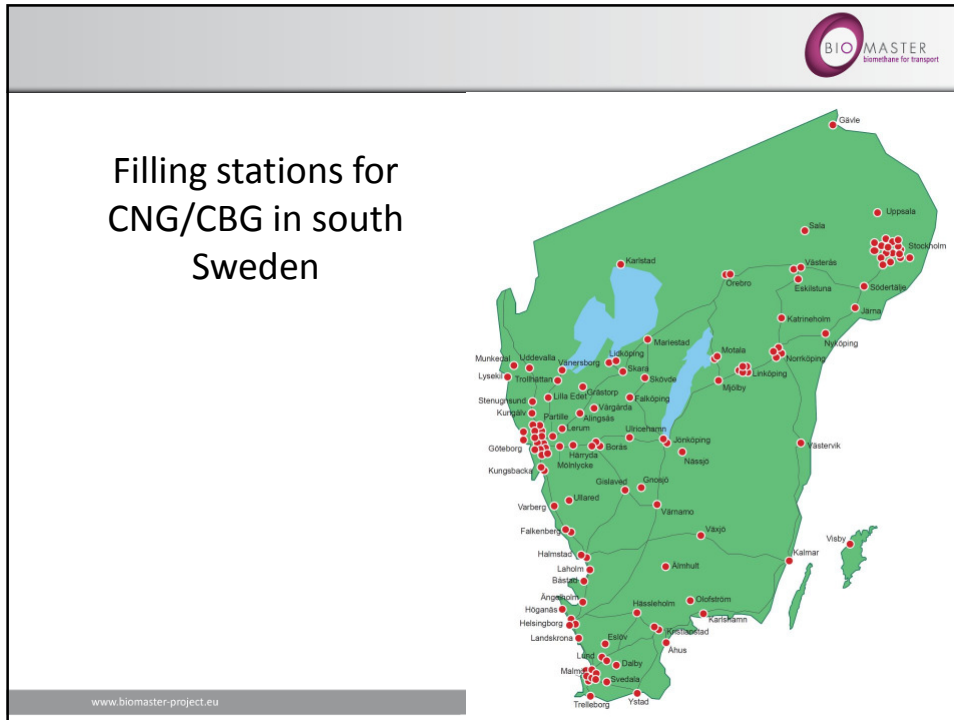


Development of CNG/CBG in Sweden



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NGV's - Technology

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Same amount of energy, different volume

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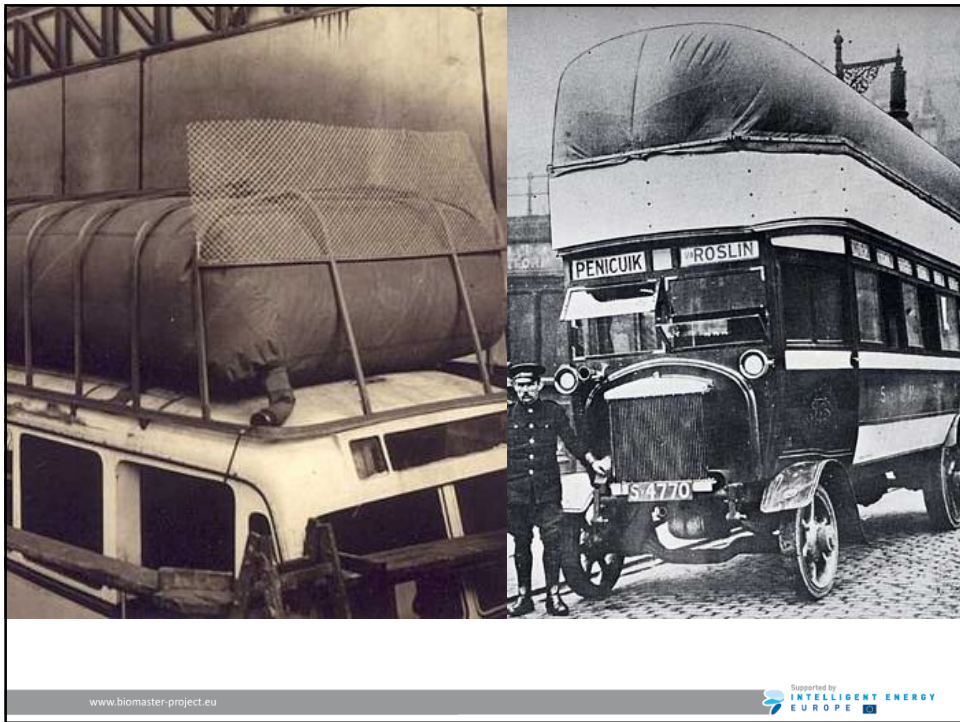
1 normalkubikmeter metangas (1Nm³)

5 l komprimerad metangas (200 bar)

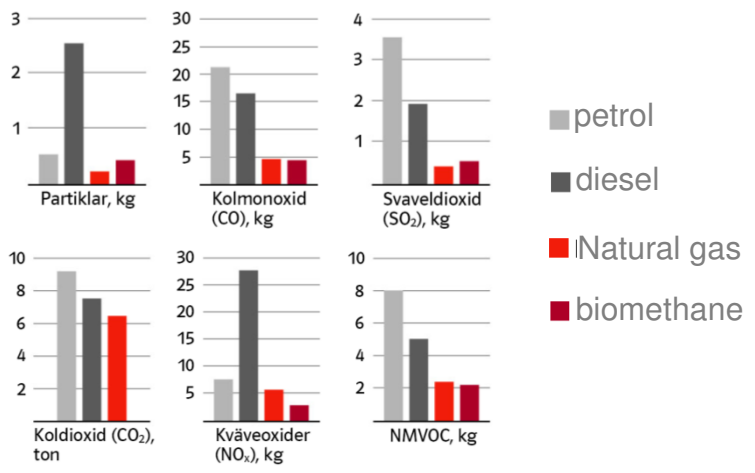
1 l dieseloilja

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Regulated emissions – light vehicles, life cycle





Some perspectives on biomethane and gas driven vehicles

- Skånetrafiken, Regional public transport (mainly buses)
- Skånemejerier, Dairy industry (mainly distribution trucks)
- Björkmans Entrémattor, door mat service (light transport vehicles)
- Wihlborgs fastigheter, real estate concern
- Sydsvenska Dagbladet, Newspaper (personal cars)

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Personal cars



Gas driven personal cars – same use as “ordinary” petrol or diesel cars

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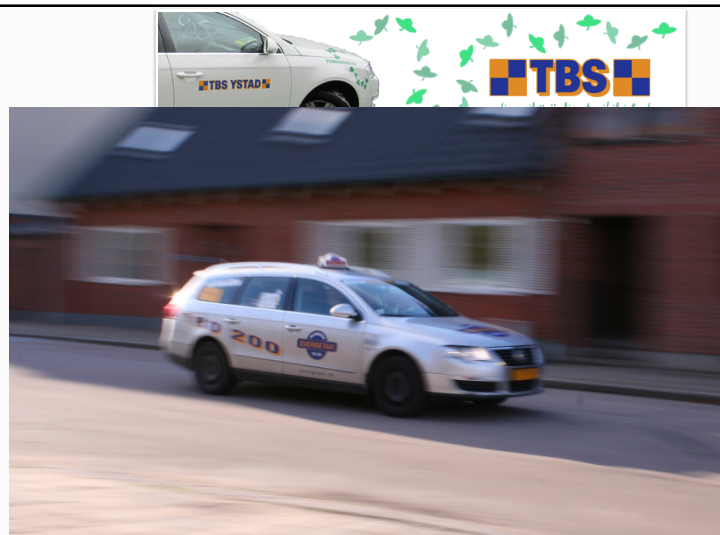
Sydsvenska Dagbladet

- Aims at becoming a carbon neutral company
- Transports are important
- Changing to gas vehicles, in total 100 cars
 - Company official cars
 - Fringe benefit cars
- Bonus – Lower total costs for the cars!



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pictures: Taxi Skåne, Taxibil Syd och Sverige Taxi Helsingborg

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Wihlborgs fastighets AB

- Main reason for changing to gas driven vehicles was that the older vehicles had poor environmental performance.
- The janitors driving the vehicles are happy with the performance.

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Björkmans Entrémattor

- Door mat service with laundry and delivery
- 20 employees
- 2600 costumers
- 8500 doormats in circulation

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A cartoon illustration of a delivery person in a suit and tie, holding a rolled-up mat. The mat has the text "Hr BJÖRKMANS ENTRÉ-MATTOR" written on it. The person is smiling and holding a small object in their raised right hand.

The Vehicles



- Mercedes Sprinter
- Volvo V70
- Mercedes B-class



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The Filling station



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Experience from changing to gas vehicles

- **No different to drive than petrol or diesel vehicles.**
- **Filling station at back yard has saved a lot of valuable time and driving distance.**
- **The cars gives us a lot of positive attention and free advertising.**

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pictures: Skånetrafiken



Gas driven city buses: initially a question of cleaner city air

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Skånetrafiken

- 128 million journeys a year
- Strong increase in travel
- A part of the regional authorities
- Politically governed – on a commercial market
- Entrepreneurs operate the services
- 66 trains, 550 regional buses, 400 city buses and 400 service transport vehicles.

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Strategy for Skånetrafiken, fossil free public transportation

- In 2007 a decision was taken by the board of public transportation – end the use of fossil fuels
- Goals:
 - 2015 – all city buses
 - 2018 – all regional buses
 - 2020 – every vehicle



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Solution – supply buses with locally produced biogas.



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Why gas driven buses?



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- **Security of supply, not dependent on imported fuel when having locally produced biogas.**
- **Biogas is renewable**
- **Biogas is Sustainable (both environmental and ethical)**
- **Contribute to local job opportunities (local production of biogas)**

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Gas driven buses so far




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- **About 400 city buses**
- **About 300 “regional buses” - inter city commuters**

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Heavy trucks

NVA VOLVO
Et genombrott



Heavy trucks: Mercedes and Scania uses otto-engines
Volvo uses methane-diesel /Dual fuel engines

Foto: Scania

Foto: Volvo

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Heavy vehicles

picture: Malmö LBC



Heavy vehicles in long distance transport:
Diesel engine – higher energy efficiency , lower fuel consumption





Heavy vehicles in city distribution:
Otto engine – cleaner exhausts

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somewhere for transport

Skånemejerier

- Mercedes Econic used for distribution of dairy products in several cities in Skåne (about 20 trucks)
- Improved emissions in city
- Improves the trademarks environmental status!
- Only half of the noise compared to replaced trucks

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Heavy vehicles working i the city:
Otto engines – cleaner exhaust

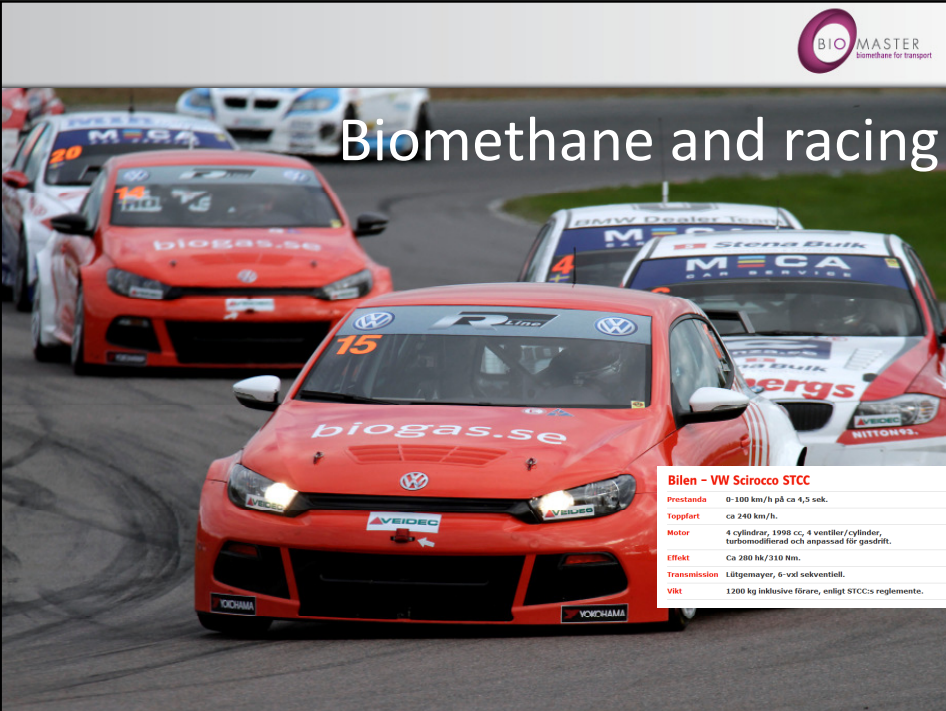


Gas driven tractors: being able to produce your own fuel



1 – 13 liter engine volume
68 – 460 hk motoreffekt

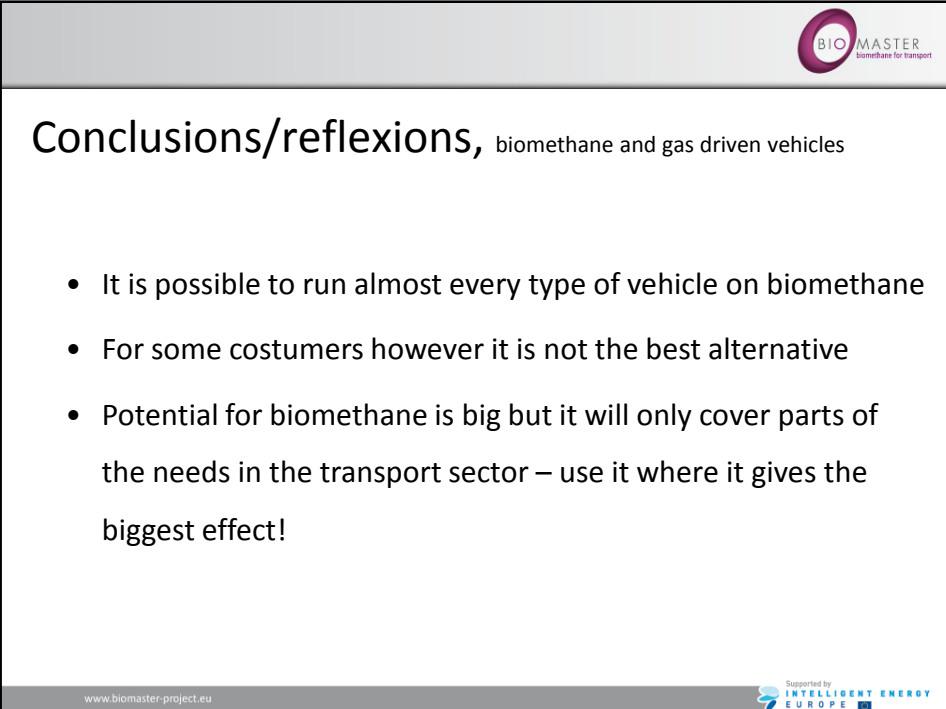
The image shows a red Renault EcoUp car on the left and a blue Volvo truck on the right, with an arrow pointing from the car to the truck. In the top right corner, there is a logo for "BIO MASTER Biomethane for transport". In the bottom left corner, the website "www.biomaster-project.eu" is listed. In the bottom right corner, there is a logo for "Supported by INTELLIGENT ENERGY EUROPE".



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Biomethane and racing

Bilen – VW Scirocco STCC	
Prestanda	0–100 km/h på ca 4,5 sek.
Toppfart	ca 240 km/h.
Motor	4 cylindrar, 1998 cc, 4 ventiler/cylinder, turbomodulerad och anpassad för gasdrift.
Effekt	Ca 280 hk/310 Nm.
Transmission	Litgemayrer, 6-vxl sekventiell.
Vikt	1200 kg inklusive förare, enligt STCC:s reglemente.



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biomethane for transport

Conclusions/reflexions, biomethane and gas driven vehicles

- It is possible to run almost every type of vehicle on biomethane
- For some costumers however it is not the best alternative
- Potential for biomethane is big but it will only cover parts of the needs in the transport sector – use it where it gives the biggest effect!

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Thank you for your attention!

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